

University of Rwanda
College of Science and Technology
Computer and Software Engineering
Data Structures and Algorithms
Assignment 1

Objective : Get familiar with the containers in the [Standard Template Library](#), especially stacks, sets and queues.

- The assignment consists in writing a C++ Programs that reads two words from the keyboard and displays the word ladder from the first word to the second, or display that no such ladder exists.
- You are given a file dictionary.txt that contains valid english words to be used in this assignment. If one or both words provide by the user are not in the dictionary, or if the words are of different length, your program should print that no word ladder exists between the two words.
- If the two words are of the same length and both are in the dictionary, then :
 - Create a queue of the partial ladders so far generated. Partial ladders are stacks , where the last formed word is at the top. Initially the queue contains one stack, containing the first word only. The algorithm proceeds as follows as long as the queue is not empty:
 1. Pop the ladder at the front of the queue and pop the the word at the top of the ladder. [If the popped word is the second word provided by the user, the ladder is found, print it](#) . Else
 2. For each [valid](#) word different from the popped word by only one character and that has not yet been put on some ladder,create a new ladder having that word at the top and push it on the queue of partial ladders.
 - If the queue of partial ladders is empty, [print that no ladder exists between](#) the two words.

- Example of a word ladder : *slow* → *flow* → *flaw* → *flat* → *fiat* → *fist* → *fast*
- You can work in groups of 3 students maximum. Groups of 2 or 1 students are accepted, but groups of more than 3 students will not be allowed.
- The Assignment will be presented no later than **Thursday March 29, 2018**, in the presence of all group members. Each group member should be prepared to answer any question about the assignment(the data structures and algorithms used).
- The evaluation will be done individually based on the program and answers to the questions (**all group members will not necessarily have the same mark**)